

## **Linear Progression for Increased External Loads during Strength Training**

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### ABSTRACT

Improvements in muscular strength require an individual to train with progressively increased external loads over time. While it is well documented that the initial adaptations to strength training occur rapidly, previous researchers have not thoroughly examined the most effective means of inducing these changes. The purpose of this study was to examine the ability to add 2.27 kg to the barbell for 20 consecutive training sessions, and to compare these responses between the sexes. Thirty-four subjects ([mean  $\pm$  SD age = 23  $\pm$  3 years] men, n = 17; women, n = 17) participated in this study. The subjects were taught how to perform the barbell deadlift exercise, and received individual instruction and verbal feedback regarding their technique throughout the entire investigation. The subjects visited the laboratory twice per week for ten weeks. The external loads corresponded to the maximum weight that each subject could use to perform five sets of five repetitions with correct technique. If five sets of five repetitions were performed, 2.27 kg were added to the barbell for the following training session. The mean external load for each training session was recorded. The data were analyzed with bivariate regression and repeated measures analyses of variance (ANOVAs). The mean  $\pm$  SD external loads used in this study increased from 66.2  $\pm$  22.3 to 123.1  $\pm$  21.8 kg for the men and 37.8  $\pm$  7.0 to 70.7  $\pm$  12.2 for the women. The results from the repeated measures ANOVAs indicated that men were able to add 2.27 kg to the barbell for 17 consecutive training sessions. For the women, however, the progress stalled at roughly week six. As a result, the coefficient of determination for the external load versus training session number relationship was  $r^2 = .960$  for the men and  $r^2 = .881$  for the women. These findings demonstrated that adding 2.27 kg to the barbell for each training session was an effective method for progressively increasing the external load over a ten week period. Many of the women had a difficult time with this gradual increase after week six, however, suggesting that smaller absolute changes with fractional plates (e.g., 0.91 kg) may be necessary.

